

## TELEGRAPH LINES.

No change has taken place since the last annual report in the total mileage (367 miles) of telegraph and telephone lines owned and operated by the Weather Bureau, no new lines having been built nor any old ones abandoned during the year.

No extensive line repairs have been needed except on the Tatooch Island section, where general repairs are now underway, preparatory to the reestablishment of telegraphic communication with the new station about to be erected on that island. A wire span, supported on steel towers, is in course of erection between the island and the mainland, in lieu of a submarine cable which, as costly experience during past years has demonstrated, can not be economically maintained in that locality.

Nineteen nautical miles of two-conductor cable, laid by the Signal Service of the Army in 1898, between Block Island and Narragansett, R. I., were recently transferred to this Bureau. This cable has been out of working order since January. It was our purpose to recover it, replace the defective parts, and relay it so as to parallel our old Block Island cable for use in case of an accident to the latter. On taking it up it was found to be too badly worn to justify the expense of again putting it down, and an appropriation of \$40,000 is recommended for the purchase and the laying of a new cable and the purchase of ground and erection of necessary buildings at each of the two termini.

The total "this line" receipts from commercial telegrams transmitted over Weather Bureau lines during the year were \$2326.17, an increase of \$597.68 over last year's receipts.

The total number of whole days and fractional parts of a day, respectively, on which telegraphic communication over Weather Bureau lines was interrupted is as follows:

From—	Whole days.	Fractional days.
Port Crescent to Neah Bay, Wash.	10	.55
San Francisco to Point Reyes, Cal.	26	15
Edgartown to Nantucket, Mass.	0	0
Block Island to Narragansett, R. I.	2	.4
Norfolk, Va., to Hatteras, N. C.	5	.47
Alpena to Middle Island, Mich.	1	.6
Alpena to Thunder Bay Island, Mich.	0	0

Under acts passed by the last Congress, specifications and plans are being prepared for purchasing and laying about 50 statute miles (more or less) of submarine telegraph cables, to connect Sand Key, Fla., with Key West, Fla.; South Manitou Island, Mich., with Glenhaven, Mich., and the Farallone Islands, Cal., with San Francisco, Cal., via Point Reyes, Cal. A teredo-proof, one-conductor cable, with rubber insulation and twelve No. 8 guard wires, will be used for the Sand Key connection, and gutta-percha cables, with twelve No. 5 guard wires, for the others.

A short telephone line, to connect the new station at North Head, Wash., with the lines terminating at Fort Canby, Wash., is now under construction.

## GENERAL CLIMATIC CONDITIONS.

By W. B. STOCKMAN, Forecast Official, in charge of Division of Meteorological Records.

## ATMOSPHERIC PRESSURE.

The numerical values of annual mean pressures for 1902 are given in Tables I and VI. The departures are given in Table I.

The method of reduction of the observed pressures to sea level, standard gravity, and to the mean of 24 hourly observations is that adopted by the Bureau on January 1, 1902, and fully described on pages 13-16 of the MONTHLY WEATHER REVIEW for that month.

## PUBLICATIONS.

The publications during the fiscal year may be summarized as follows:

	TOTAL OUTPUT.
Forecast cards:	
Manila .....	15,785,760
Paper .....	2,370,105
Station maps .....	4,087,792
Station forms, all kinds .....	2,738,130
Weather maps, Washington .....	539,772
Climate and crop bulletins .....	140,089
Monthly Weather Reviews .....	52,750
Lake charts .....	44,500
Snow and ice bulletins .....	31,043
Total .....	25,789,941

These figures relate only to work done within the Publications Division, and do not include miscellaneous printing for the Bureau done outside under authority of over 800 orders. They mean that 25,790,000 pieces, weighing more than 270 tons, were here printed, cut, bound or otherwise made into suitable packages, wrapped, and mailed.

## WORK DONE AT THE GOVERNMENT PRINTING OFFICE.

	PIECES.
Forecast cards:	
Manila .....	13,000,000
Paper .....	13,000,000
Station maps .....	3,450,000
Total .....	29,450,000

These were also mailed to stations.

Other printing done at the Government Printing Office includes 2 quarto bulletins, aggregating 2700 copies; 7 octavo bulletins, aggregating 24,500 copies, and 625,000 miscellaneous forms.

To the above quantities are to be added 2,250,000 blank forecast cards, manila, shipped direct by the contractor to stations, and 2,000,000 paper forecast cards printed here previous to, but mailed after June 30, 1902.

## ECLIPSE METEOROLOGY AND ALLIED PROBLEMS.

The track of the total solar eclipse of May 28, 1900, crossed the Southern States from New Orleans to Norfolk and afforded an unusual opportunity for studying some of the physical problems connected with the effects of solar radiation in the earth's atmosphere. The observations made in the eclipse track have been discussed by Prof. Frank H. Bigelow, and the results appear in Bulletin I, Weather Bureau, 1902, Eclipse Meteorology and Allied Problems. It is there shown what preliminary meteorological observations should be made for determining the position of eclipse stations. Professor Bigelow demonstrates that the so-called eclipse cyclone does not exist in the atmosphere; he also shows that the shadow bands are due to the light from the sun's crescent shining through the interstices of the mixture of currents of different densities that exist in the lowest layers of the atmosphere. A review of the scientific status of the problems of solar physics follows, in which the parallelism between the meteorology of the sun and that of the earth is indicated.

The sea-level values thus obtained are shown on Chart I.

The pressure on the 10,000-foot plane is also obtained as indicated on the same pages of the above-mentioned REVIEW, and the resulting isobars are shown on Chart II.

The mean annual barometric pressure was highest over Kentucky, Tennessee, the northern portion of the east Gulf States, and parts of the South Atlantic States, and lowest over the southern Plateau region. Except in parts of the central portions of Kentucky and Tennessee, and on the coast of cen-

tral California, the annual pressure values were below the normal. In the regions where the pressure was above the normal the departures were not so large as they were where negative. The location of the areas of highest and lowest mean annual pressure did not materially differ from that for the year 1901.

#### TEMPERATURE.

The distribution of mean surface temperature is shown on Chart III and the district departures by Table VIII.

The mean annual temperature was below the normal in southeastern Washington, Nevada, eastern and southern California, western Arizona, West Virginia, southern Ohio, Kentucky, Indiana, central Illinois, central Missouri, the Florida Peninsula, and parts of the South Atlantic States, but, as a rule, with slight departures. Elsewhere it was above normal, and generally with departures greater than where they were below. The areas of plus and minus departures as determined by a consideration of reports from Climate and Crop centers differ slightly in location from those based on reports from regular Weather Bureau stations only, but the difference in position is not marked. In Arkansas the departures during the fall months averaged nearly  $5^{\circ}$  per day above the normal. In Georgia July was the warmest in eleven years; in Mississippi June, August, and November were the warmest of record, as also was November in Kentucky and West Virginia. June was the coolest of record in West Virginia.

#### PRECIPITATION.

The distribution of annual precipitation is shown on Chart IV and the district departures by Table IX.

The precipitation was deficient generally in the Atlantic and Gulf States, eastern lower Lake region, northwestern upper Lake region, upper Missouri Valley, the Plateau regions, and portions of California. In eastern Massachusetts the deficiency amounted to about 11 inches; in southeastern Virginia, the eastern portions of the Carolinas, east-central Florida, and the Gulf coast, except at Corpus Christi, from 13 to 26.3 inches; at Escanaba, Mich., 10.2 inches, and Erie, Pa.,

11.5 inches. Tacoma, Wash., reports an excess of 10 inches; Seattle, Wash., 9.9 inches; Eureka, Cal., 12.5 inches, and Lincoln, Nebr., 14.4 inches; elsewhere the excess departures were, as a rule, not very large. Over southeastern New York, Delaware, New Jersey, southeastern Pennsylvania, eastern Maryland, the District of Columbia, and northern Virginia the precipitation was in excess from 2.3 to 9.9 inches, and in the area surrounding this locality the departures were markedly deficient. Similar conditions obtained between northeastern and east-central Florida, about Lake Erie, northwestern and west-central California, and portions of the Missouri Valley and northern slope. Kansas and Oklahoma report the heaviest annual precipitation of record.

The amount of snow on the ground at the end of the year was deficient over the eastern slope of the Big Horn Mountains, in Wyoming. In all other mountain districts the amount of snow on the ground indicates a good flow of water for irrigation purposes during the coming crop season.

#### THUNDERSTORMS.

The frequency of thunderstorm days in the different months and in the several States and Territories is shown approximately by the figures of Tables III and IV.

The first-named table has been prepared from reports of both regular and voluntary observers, with a view to showing the number of thunderstorm days recorded each month in the immediate neighborhood of the respective stations.

The second table shows the number of days on which thunderstorms were recorded in the State or Territory as a whole. In preparing the last-named table reports from all stations whatsoever were used. The number of thunderstorm days for a given State, as shown in Table IV, depends largely upon the size of the State and the number and distribution of the observing stations. In the District of Columbia, for example, with but one observing station, the number of thunderstorm days was 48, while for the adjacent State of Maryland, with an average of 48 stations, thunderstorms were observed on 113 days. In Virginia, with about 52 stations, the number of thunderstorm days was 127.

TABLE I.—Annual climatological summary, Weather Bureau stations, 1902.

Districts and stations.		Elevation of barometer above sea level.	Pressure in inches.†				Temperature of the air, in degrees, Fahrenheit.				Precipitation.				Winds.				Average cloudiness, tenths.		Total snowfall, inches.‡		
			Actual, reduced to mean of 24 hours.	Sea level, reduced to mean of 24 hours.	Departure from normal.	Mean max. - mean min. + 2.	Maximum.	Departure from normal.	Mean maximum.	Minimum.	Mean minimum.	Annual range.	Mean temperature of the dew-point.	Mean relative humidity, per cent.	Total, in inches.	Days with .01, or more.	Miles, per hour.	Prevailing direction.	Max. velocity.	Cloudy days.	Partly cloudy days.	Total.	
<i>New England.</i>																							
Eastport		76	29.86	29.94	- .03	47.0	+0.4	+1.3	84	50	15	36	78	41.47	- 2.18	167	96,337	s.w.	54	e.	113	155	5.7
Portland, Me.		103	29.83	29.95	- .05	45.4	-0.3	-1.0	90	52	19	33	104	41.41	- 3.77	133	82,003	n.w.	44	s.	96	142	5.2
Northfield		876	29.02	29.99	- .02	41.2	0.0	-.8	92	57	8	31	107	47.75	+ 5.49	169	73,117	s.	40	n.w.	52	119	7.0
Boston		125	29.84	29.98	- .03	49.6	+1.0	+1.0	89	54	1	1	100	41.74	- 3.73	133	98,517	e.	46	w.	128	90	45.3
Nantucket		12	29.97	29.98	- .04	49.2	+0.4	+0.4	80	55	1	1	81	43.82	- 35.97	135	129,649	sw.	64	e.	79	154	6.2
Block Island		26	29.96	29.99	- .03	49.8	+0.2	+0.2	88	57	5	4	83	43.83	+ 1.44	136	73,73	ne.	125	141	99	4.9	24.4
Narragansett																					188	61	
New Haven		108	29.87	29.99	- .04	49.8	+0.4	+0.4	80	54	5	4	95	40	- 3.58	159	82,339	n.	57	ne.	171	85	109
<i>Middle Atlantic States.</i>																						5.5	
Albany		97	29.89	30.00	- .03	48.0	-0.2	-0.2	92	57	11	39	103	38	- 0.38	154	67,161	s.	47	w.	99	109	55.6
Binghamton		875	29.05	29.99	- .05	46.6	+0.2	+0.2	89	56	9	38	98	36.70	- 0.58	171	57,303	sw.	56	ne.	58	147	6.6
New York		314	29.66	30.00	- .04	52.6	+0.9	+0.9	91	59	8	46	83	42	- 2.27	140	128,906	n.w.	74	n.w.	113	112	31.3
Harrisburg		374	29.62	30.03	- .02	51.9	-0.4	-0.4	95	60	7	44	83	39.84	- 4.22	123	66,580	w.	49	w.	97	128	5.9
Philadelphia		117	29.89	30.02	- .03	54.2	+0.8	+0.8	95	62	12	46	85	43	- 0.92	128	96,244	n.w.	52	n.	130	103	28.8
Seranton		805	29.14	30.01	- .03	48.8	-0.1	-0.1	90	58	2	40	83	39	- 0.55	146	66,285	sw.	48	n.w.	74	127	6.6
Atlantic City		52	29.96	30.02	- .02	52.4	+0.5	+0.5	94	59	12	46	82	50	- 0.87	181	80,170	d.w.	45	e.	126	166	7.1
Cape May		17	30.02	30.04	- .00	53.0	-0.6	-0.6	92	59	14	47	78	46	- 4.02	130	77,124	d.w.	43	s.	123	161	8.5
Baltimore		123	29.88	30.01	- .04	55.2	0.0	0.0	99	63	13	47	86	45	- 6.18	122	60,166	w.	70	w.	107	126	5.6
Washington		112	29.90	30.02	- .04	54.9	+0.2	+0.2	99	64	5	46	94	44	- 3.12	121	62,125	n.w.	40	n.w.	144	132	4.8
Lynchburg		681	29.24	30.02	- .05	56.8	-0.1	-0.1	99	67	13	47	85	45	- 5.94	109	40,337	n.w.	40	n.w.	135	91	10.3
Norfolk		91	29.93	30.03	- .02	50.3	+0.3	+0.3	98	67	18	51	80	50	- 13.60	117	83,142	s.	54	n.w.	175	109	8.4
Richmond		144	29.88	30.03	- .03	58.1	-0.1	-0.1	98	68	15	49	83	49	- 0.32	107	49,036	n.	40	s.	129	106	13.0
<i>South Atlantic States.</i>																						5.7	
Charlotte		773	29.21	30.05	- .02	60.2	+0.3	+0.3	98	69	16	51	82	49	- 6.60	124	56,985	ne.	42	w.	147	112	106
Hatteras		11	30.02	30.03	- .03	61.6	+0.2	+0.2	92	67	24	56	68	55	- 0.38	109	10,413	sw.	60	ne.	161	103	4.7
Raleigh		376	29.64	30.04	- .02	59.9	+0.8	+0.8	101	70	17	50	84	48	- 0.58	123	54,914	sw.	32	sw.	152	99	5.0
Wilmington		78	29.95	30.03	- .03	62.7	-0.3	-0.3	100	71	19	54	81	53	- 19.76	113	73,896	w.	45	w.	137	149	4.6
Charleston		48	30.00	30.05	- .02	65.7	-0.1	-0.1	103	73	23	59	80	57	- 19.52	106	94,048	e.	45	w.	108	193	4.8
Columbia		351	29.67	30.05	- .02	63.1	-0.6	-0.6	101	73	18	54	83	51	- 26.20	132	69,777	ne.	55	n.	124	141	5.2
Augusta		180	29.85	30.04	- .03	64.1	+0.2	+0.2	102	74	19	54	83	53	- 4.56	165	53,184	sw.	45	ne.	177	104	4.3
Savannah		65	29.98	30.05	- .01	67.0	-0.6	-0.6	101	75	24	59	77	58	- 4.56	111	69,319	sw.	42	w.	158	152	4.2
Jacksonville		43	29.98	30.03	- .03	74.1	0.0	0.0	101	77	24	60	77	59	- 6.09	127	74,157	se.	55	s.	135	144	4.6
<i>Florida Peninsula.</i>																						0.0	
Jupiter		28	29.99	30.02	- .01	74.4	+0.8	+0.8	96	81	38	68	58	60	- 13.89	119	91,963	se.	48	sw.	125	202	4.6
Key West		22	29.98	30.00	- .02	76.4	-0.7	-0.7	91	80	72	41	67	67	- 0.15	167	150	se.	36	ne.	111	166	5.1
Tampa		34	29.99	30.03	- .01	71.5	0.1	0.1	96	80	29	63	67	62	- 4.53	103	56,552	e.	49	s.	111	166	5.1
<i>East Gulf States.</i>																						0.0	
Atlanta		1,174	28.81	30.05	- .02	61.1	-0.1	-0.1	98	70	15	52	83	48	- 0.38	109	38,000	sw.	51	n.	116	136	5.3
Macon		370	29.65	30.05	- .01	63.8	-0.1	-0.1	101	74	17	54	84	51	- 15.35	102	87,323	de.	52	sw.	124	94	5.0
Pensacola		56	29.98	30.04	- .01	68.0	+0.4	+0.4	97	75	24	61	73	52	- 13.95	114	64,367	n.	46	sw.	141	133	4.0
Mobile		57	29.99	30.04	- .01	67.2	+0.5	+0.5	98	75	23	59	75	58	- 10.10	103	59,506	e.	45	w.	142	106	5.0
Montgomery		229	29.80	30.03	- .03	65.6	+0.4	+0.4	101	75	17	56	84	50	- 0.06	105	48,339	sw.	38	sw.	130	133	0.3
Meridian		375	29.64	30.04	- .02	69.9	-0.1	-0.1	102	74	16	54	86	51	- 4.60	105	48,339	w.	41	n.	134	116	5.1
Vicksburg		247	29.74	30.00	- .06	65.7	+0.4	+0.4	99	74	22	57	77	53	- 8.35	96	59,895	se.	41	w.	110	142	11.3
New Orleans		51	29.97	30.02	- .02	69.4	+0.6	+0.6	98	77	28	62	70	59	- 18.91	97	74,187	se.	42	ne.	110	142	5.5
<i>West Gulf States.</i>																						0.2	
Shreveport		249	29.75	30.02	- .01	65.6	+0.4	+0.4	100	75	23	56	77	50	- 1.28	99	59,956	se.	40	sw.	150	112	103
Fort Smith		457	29.51	29.99	- .04	61.1	+1.3	+1.3	101	70	10	52	91	48	- 9.62	106	78,391	e.	64	w.	96	199	12.8
Little Rock		357	29.65	30.03	- .01	61.7	+0.2	+0.2	97	70	16	54	81	50	- 0.36	105	63,449	sw.	46	w.	141	132	4.8
Corpus Christi		20	29.96	29.98	- .01	71.5	+1.4	+1.4	95	77	23	66	67	63	- 21.59	80	21,539	w.	82	n.	152	61	4.0
Fort Worth		670	29.29	29.98	- .03	65.6	+1.4	+1.4	103	76	13	56	90	40	- 29.31	82	103,502	s.	52	sw.	176	124	3.9
Galveston		54	29.92	29.98	- .05	69.7	-0.1	-0.1	91	74	32	66	59	62	- 37.67	81	37,687	se.	52	ne.	159	124	0.0
Palestine		510	29.47	30.01	- .01	66.0	+0.8	+0.8	97	75	18	57	79	56	- 0.73	97	67,356	s.	48	sw.	130	127	5.2
San Antonio		701	29.24	29.96	- .03	69.9	+1.4	+1.4	103	80	26	60	77	53	- 4.91	77	79,892	w.	55	sw.	124	142	5.1
Taylor		583	29.34	29.99	- .01	67.6	-0.1	-0.1	100	78	18	57	82	41	- 51.27	88	86,594	e.	40</				

TABLE I.—*Annual climatological summary, Weather Bureau stations, 1902—Continued.*

Districts and stations.	Elevation of barometer above sea level.	Pressure in inches.†				Temperature of the air, in degrees Fahrenheit.						Precipitation.				Winds.			
		Actual, reduced to mean of 24 hours.		Sea level, reduced to mean of 24 hours.		Departure from normal.		Mean maximum, + mean minimum, + 2.			Mean maximum.			Mean minimum.			Total movement, miles.		
		Mean maximum.	Mean minimum.	Departure from normal.	Mean maximum.	Mean minimum.	Annual range.	Mean maximum.	Mean minimum.	Annual range.	Mean relative humidity, per cent.	Total, in inches.	Departure from normal.	Days with .01, or more.	Prevailing direction.	Miles, per hour.	Max. velocity.		
<i>Upper Miss. Val.—Cont'd.</i>																			
St. Paul	837	29.07	29.99	-.02	45.0	+1.7	88	53	-18	37	106	35	74	+ 4.28	119	69,950	n.w.		
La Crosse	714	29.23	30.01	-.01	46.7	+0.7	91	56	-24	38	115	30	26	- 0.42	116	67,059	s.		
Davenport	606	29.34	29.98	-.05	49.6	+0.4	92	58	-13	41	105	41	76	- 0.59	119	67,654	w.		
Des Moines	861	29.09	30.02	-.00	49.2	+0.7	94	58	-16	40	110	40	76	- 0.21	121	77,440	s.w.		
Dubuque	698	29.25	30.00	-.02	48.1	+0.5	90	57	-18	40	108	38	73	- 0.34	130	60,099	u.w.		
Keokuk	614	29.34	30.00	-.03	51.9	+0.5	96	60	-10	43	106	43	77	- 0.86	148	67,175	s.w.		
Cairo	836	29.66	30.04	-.01	58.1	+0.4	98	66	-7	50	91	49	76	- 0.07	108	72,225	s.		
Springfield, Ill.	644	29.33	30.00	-.04	52.2	-0.1	94	61	-8	44	102	48	75	- 0.36	129	82,361	s.w.		
Hannibal	534	29.44	30.02	-.01	52.6	+0.1	94	62	-1	45	102	35	63	- 0.03	130	80,999	s.w.		
St. Louis	567	29.41	30.01	-.03	57.5	+1.9	98	64	-1	49	99	46	72	- 0.48	125	80,479	s.		
<i>Missouri Valley.</i>					50.1	+0.8	92	69	-1	49	99	46	72	- 0.89	130	89	+ 1.55		
Columbia	784	29.18	30.03	-.00	53.3	-1.7	94	63	-11	44	105	43	72	- 0.52	117	72,382	s.		
Kansas City	962	28.99	30.03	-.01	54.1	+0.9	96	63	-7	46	103	43	72	- 0.18	123	73,432	s.		
Springfield, Mo.	1,324	28.61	30.01	-.02	54.9	0.0	93	63	-3	47	96	47	79	- 0.30	124	88,222	s.e.		
Topeka					53.4	-0.4	100	63	-10	44	110	32	61	- 0.98	110	82,280	s.		
Lincoln	1,189	28.70	29.97	-.04	50.4	+0.3	96	60	-11	41	107	40	73	- 0.22	144	96,879	s.		
Omaha	1,105	28.80	29.99	-.03	50.4	+0.8	96	59	-12	42	108	40	72	- 0.48	109	76,342	s.e.		
Valentine	2,598	27.22	29.94	-.06	46.4	+0.1	106	59	-8	26	132	33	68	- 1.61	121	94,834	u.w.		
Sioux City	1,135	28.77	30.00	-.02	47.5	+0.5	95	57	-21	38	116	32	20	- 0.34	113	112,305	n.w.		
Pierre	1,572	28.30	29.98	-.02	46.7	+1.3	108	57	-2	36	130	32	64	- 0.20	104	70,698	s.e.		
Huron	1,306	28.55	30.00	-.01	48.8	+1.5	101	55	-26	32	127	34	74	- 0.16	91	102,512	s.e.		
Yankton					45.0	+0.8	102	61	-19	38	121	37	70	- 0.27	144	86,614	s.e.		
<i>Northern Slope.</i>					54.2	+0.8	96	60	-11	41	107	40	73	- 0.28	144	86,389	+ 3.81		
Havre	2,505	27.29	29.95	-.02	41.7	+0.6	98	53	-26	30	124	31	72	- 1.15	83	96,458	s.w.		
Miles City	2,371	27.42	29.94	-.05	45.7	+1.5	98	57	-22	34	120	38	81	- 0.60	126	73,023	s.		
Helena	4,110	25.74	29.97	-.04	43.5	+0.4	92	53	-24	34	116	27	59	- 0.09	85	64,119	s.w.		
Kalispell	2,965	26.89	29.94	-.03	42.2	0.0	89	52	-18	32	107	31	71	- 1.21	182	45,740	w.		
Rapid City	3,234	26.56	29.94	-.05	46.1	+0.1	102	58	-22	35	124	32	65	- 0.51	144	87,332	s.w.		
Cheyenne	6,088	23.97	29.92	-.05	45.0	+0.6	94	57	-27	33	121	27	57	- 1.50	98	89,794	n.w.		
Lander	5,372	24.80	29.96	-.04	43.4	+1.0	94	58	-30	29	124	26	60	- 0.46	134	82,328	s.w.		
North Platte	2,821	27.05	29.98	-.01	49.3	+1.4	102	61	-19	38	121	37	70	- 0.26	144	93,328	s.w.		
<i>Middle Slope.</i>					50.2	+0.8	102	61	-19	38	121	37	70	- 0.28	144	86,614	+ 3.81		
Denver	5,291	24.69	29.92	-.04	51.0	+1.6	100	64	-20	38	120	30	54	- 1.14	70	69,379	s.w.		
Pueblo	4,685	25.24	29.90	-.05	51.9	+0.8	104	67	-10	37	114	39	51	- 1.76	55	61,773	s.w.		
Concordia	1,398	28.51	29.99	-.02	52.7	+0.5	104	63	-14	43	118	42	75	- 0.22	129	69,751	s.		
Dodge	2,509	27.36	29.95	-.03	54.5	+1.4	105	67	-11	42	116	40	70	- 1.70	124	104,801	s.e.		
Wichita	1,358	28.57	30.01	-.00	55.7	+0.3	102	65	-12	46	114	44	72	- 0.14	122	64,850	s.e.		
Oklahoma	1,214	28.70	29.98	-.02	59.4	0.0	101	69	0	50	101	48	73	- 0.14	144	80,931	s.e.		
<i>Southern Slope.</i>					60.6	+1.4	106	75	-10	54	106	43	54	- 0.05	144	89,132	s.e.		
Abilene	1,738	28.16	29.96	-.02	64.7	+1.3	106	75	-10	54	96	48	63	- 0.05	144	86,736	s.e.		
Amarillo	3,676	26.22	29.91	-.05	56.4	+1.6	105	69	-4	44	109	38	60	- 1.65	144	128	s.w.		
<i>Southern Plateau.</i>					59.6	-0.2	97	63	-18	33	115	43	54	- 0.04	144	86,298	s.e.		
El Paso	3,762	26.14	29.85	-.04	64.3	+0.9	105	78	-24	50	81	32	40	- 0.15	144	93,975	n.w.		
Santa Fe	7,013	23.25	29.90	-.03	50.2	+1.9	91	61	-8	39	83	26	46	- 0.36	144	78,000	s.w.		
Flagstaff	6,907	23.34	29.88	-.02	44.1	-3.6	98	57	-12	31	105	36	25	- 0.86	144	23,922	s.w.		
Phoenix	1,108	28.73	29.87	-.01	70.3	+1.2	116	85	-30	56	86	36	68	- 0.05	144	37,885	e.		
Yuma	141	29.71	29.86	-.02	71.8	-0.9	116	86	-31	57	85	41	40	- 1.93	144	64,850	w.		
Independence	3,910	25.94	29.91	-.03	57.6	-1.0	100	70	10	45	90	32	29	- 1.90	144	71,836	n.w.		
<i>Middle Plateau.</i>					59.2	-0.1	103	66	-4	39	107	43	49	- 0.05	144	70,05	s.w.		
Carson City	4,720	25.26	29.96	-.03	48.6	-0.8	96	62	-2	35	98	31	57	- 0.55	144	56,248	s.w.		
Winnebucca	4,344	25.59	29.99	-.02	47.9	-0.7	97	62	-15	34	112	32	51	- 0.49	144	76,479	s.e.		
Modena	5,479	24.58	29.92	-.03	48.1	-0.4	97	63	-18	33	115	19	52	- 0.09	144	64,749	s.e.		
Salt Lake City	4,366	25.59	29.95	-.04	52.0	+0.7	98	62	-4	42	102	29	48	- 1.41	144	44,737	n.w.		
Grand Junction	4,608	25.35	29.96	-.00	52.5	+0.5	103	66	-4	39	107	43	44	- 2.24	144	47,387	n.w.		
<i>Northern Plateau.</i>					49.8	+0.3	96	62	-2	35	98	43	49	- 0.09	144	47,387	s.w.		
Baker City	3,471	26.42	30.01	-.03	45.7	+0.8	95	56	-8	36	108	29	60	- 0.20	144	52,226	s.e.		
Boise	2,739	27.15	30.02	-.02	51.1	+0.4	102	62	-8	40	110	32	57	- 1.27	144	38,244	s.e.		
Lewiston	757	29.18	30.00	-.04	53.1	-0.4	104	64	-5	43	109	38	63	- 0.02	144	108,326	s.e.		
Pocatello	4,482	25.46	29.98	-.04	47.5	+1.9	95	59	-19	36	114	29	57	- 1.44	144	33,883	s.e.		
Spokane	1,943	27.95	30.01	-.01	47.9	+0.1	94	57	-12	38	106	34	66	- 1.23	144	77,983	s.e.		
Walla Walla	1,000	28.93	30.00	-.04	52.4	-0.8	100	62	-2	43	102	43	45	- 2.24	144	58,031	s.e.		
<i>N. Pac. Coast Region.</i>					51.2	+0.7	95	56	-8	36	108	29	60	- 0.25	144	14,744	s.e.		
Port Crescent	259	29.75	30.00	-.01	46.9	+0.3	90	54	12	40	78	45	75	- 0.42	144	52,70	w.		
Seattle	123	29.89	30.02	-.00	52.2	+1.3	95	59	13	46	82	43	75	- 0.88	144	62,048	s.e.		
Takoma	213	29.78	30.01	-.02	50.9	+1.1	94	58	15	44	79	43	54	- 10.04	144	51,714	s.w.		
Astoria	20				60.5	-0.5	97	60	13	45	84	44	76	- 0.15	144	60,151	s.e.		
Portland	154	29.85	30.01	-.04	52.6	+0.1	97	60	13	45</									

TABLE II.—Resultant winds from observations at 8 a. m. and 8 p. m., daily, during the year 1902.

Stations.	Component direction from—				Resultant.		Stations.	Component direction from—				Resultant.	
	N.	S.	E.	W.	Direction from—	Duration.		N.	S.	E.	W.	Direction from—	Duration.
<i>New England.</i>							<i>North Dakota.</i>						
Eastport, Me.	238	205	119	308	n. 81 w.	190	Moorhead, Minn.	262	240	217	233	n. 36 w.	27
Portland, Me.	253	234	98	298	n. 84 w.	200	Bismarck, N. Dak.	295	165	226	212	n. 26 e.	181
Concord, N. H.							Williston, N. Dak.	282	219	144	209	n. 46 w.	92
Northfield, Vt.	258	381	64	125	s. 27 w.	134	<i>Upper Mississippi Valley.</i>						
Boston, Mass.	211	187	181	348	d. 85 w.	221	St. Paul, Minn.	222	282	179	236	s. 43 w.	88
Nantucket, Mass.	220	224	162	300	s. 88 w.	136	La Crosse, Wis. †	113	174	58	77	s. 17 w.	64
Block Island, R. I.	194	216	174	332	s. 82 w.	161	Davenport, Iowa.						
New Haven, Conn.	300	216	93	266	n. 65 w.	188	Des Moines, Iowa.	214	246	214	236	s. 34 w.	39
<i>Middle Atlantic States.</i>							Dubuque, Iowa.	226	253	192	252	s. 66 w.	66
Albany, N. Y.	259	263	121	236	s. 88 w.	116	Keokuk, Iowa.	215	254	186	263	s. 63 w.	87
Binghamton, N. Y. †	117	59	126	139	n. 13 w.	59	Cairo, Ill.	238	288	189	180	s. 10 e.	51
New York, N. Y.	250	184	155	319	n. 68 w.	175	Springfield, Ill.	202	259	162	282	s. 65 w.	133
Harrisburg, Pa.	149	82	189	28	s. 28 w.	74	Hannibal, Mo. †	96	137	90	124	s. 39 w.	58
Philadelphia, Pa.	261	211	157	271	n. 60 w.	121	St. Louis, Mo.	210	317	137	193	s. 28 w.	122
Scranton, Pa.	289	204	187	238	n. 30 w.	98	<i>Missouri Valley.</i>						
Atlantic City, N. J.	255	216	141	307	n. 77 w.	165	Columbia, Mo. *	104	139	113	92	s. 31 e.	41
Cape May, N. J.	244	232	149	253	n. 83 w.	105	Kansas City, Mo.	224	305	206	153	s. 34 e.	97
Baltimore, Md.	238	200	151	289	n. 74 w.	137	Springfield, Mo.	183	334	226	164	s. 28 e.	163
Washington, D. C.	261	236	164	218	n. 66 w.	60	Topeka, Kans.						
Lynchburg, Va.	217	207	195	297	n. 84 w.	100	Lincoln, Nebr.	262	290	204	131	s. 62 e.	81
Norfolk, Va.	226	300	214	152	s. 40 e.	97	Omaha, Nebr.	241	287	198	164	s. 36 e.	57
Richmond, Va.	250	260	170	201	s. 72 w.	83	Valentine, Nebr.	237	267	163	273	s. 74 w.	114
Wytheville, Va.							Sioux City, Iowa †	130	133	106	95	s. 75 e.	11
<i>South Atlantic States.</i>							Pierre, S. Dak.	243	204	269	162	s. 67 e.	116
Asheville, N. C.	213	233	238	206	s. 39 e.	61	Huron, S. Dak.	254	253	226	180	n. 89 e.	86
Charlotte, N. C.	213	253	206	s. 82 e.	15	<i>Northern Slope.</i>							
Hatteras, N. C.	191	193	224	209	s. 82 e.	15	Havre, Mont.	187	176	186	370	n. 87 w.	187
Kittyhawk, N. C. †							Miles City, Mont.	228	222	154	252	n. 86 w.	98
Raleigh, N. C.	253	221	167	261	n. 71 w.	99	Helena, Mont.	137	270	83	439	s. 70 w.	379
Wilmington, N. C.	219	218	223	238	n. 86 w.	15	Kalispell, Mont.	117	203	121	435	s. 74 w.	324
Charleston, S. C.	220	214	209	243	n. 80 w.	34	Rapid City, S. Dak.	254	148	177	310	s. 51 w.	189
Columbia, S. C.	225	222	265	211	n. 87 e.	54	Cheyenne, Wyo.	248	205	82	347	s. 81 w.	268
Augusta, Ga.	234	207	215	247	n. 40 w.	42	Lander, Wyo.	184	278	159	286	s. 54 w.	157
Savannah, Ga.	223	197	211	259	n. 62 w.	55	North Platte, Nebr.	181	235	226	250	s. 24 w.	59
Jacksonville, Fla.	244	221	231	217	n. 31 e.	27	<i>Middle Slope.</i>						
<i>Florida Peninsula.</i>							Denver, Colo.	232	278	201	180	s. 25 e.	51
Jupiter, Fla.	178	240	251	203	s. 38 e.	78	Pueblo, Colo.	278	163	226	225	s. 89 e.	115
Key West, Fla.	222	141	430	87	n. 77 e.	352	Concordia, Kans.	196	328	184	135	s. 20 w.	141
Tampa, Fla.	280	142	269	209	n. 23 e.	151	Dodge, Kans.	236	252	279	150	s. 83 e.	129
<i>Eastern Gulf States.</i>							Wichita, Kans.	231	354	185	84	s. 39 e.	160
Atlanta, Ga.	230	215	205	243	d. 69 w.	41	Oklahoma, Okla.	210	356	191	83	s. 40 e.	166
Macon, Ga. †	141	109	78	109	n. 44 w.	45	<i>Southern Slope.</i>						
Pensacola, Fla. †	167	71	120	92	d. 16 e.	100	Abilene, Tex.	179	355	284	116	s. 44 e.	243
Mobile, Ala.	290	247	146	187	n. 44 w.	59	Amarillo, Tex.	170	382	164	187	s. 6 w.	211
Montgomery, Ala.	221	218	238	206	n. 85 e.	32	<i>Southern Plateau.</i>						
Meridian, Miss. †	124	102	112	109	n. 8 e.	22	El Paso, Tex.	252	91	244	821	n. 25 w.	177
Vicksburg, Miss.	200	252	278	161	s. 66 e.	127	Santa Fe, N. Mex.	211	261	278	158	s. 67 e.	125
New Orleans, La.	237	270	248	157	s. 70 e.	96	Flagstaff, Ariz.	205	201	127	357	s. 89 w.	232
<i>Western Gulf States.</i>							Phoenix, Ariz.	135	181	308	281	s. 82 e.	27
Shreveport, La.	169	308	278	148	s. 48 e.	191	Yuma, Ariz.	223	207	177	250	s. 77 w.	74
Fort Smith, Ark.	151	163	376	148	s. 87 e.	229	Independence, Cal.	251	227	141	304	s. 81 w.	166
Little Rock, Ark.	215	263	213	206	s. 8 e.	48	<i>Middle Plateau.</i>						
Corpus Christi, Tex.	161	328	378	54	s. 62 e.	365	Carson City, Nev.	156	260	98	351	s. 68 w.	276
Fort Worth, Tex.	167	369	210	143	s. 18 e.	210	Winnemucca, Nev.	239	198	190	295	s. 69 w.	111
Galveston, Tex.	160	341	315	98	s. 49 e.	282	Modena, Utah.	108	227	113	129	s. 69 w.	337
Palestine, Tex.	188	338	239	109	s. 41 e.	198	Salt Lake City, Utah.	252	233	265	175	s. 78 e.	92
San Antonio, Tex.	181	286	305	66	s. 73 e.	346	Grand Junction, Colo.	219	186	266	256	s. 17 e.	34
Taylor, Tex. †	104	188	68	60	s. 5 e.	84	<i>Northern Plateau.</i>						
<i>Ohio Valley and Tennessee.</i>							Baker City, Oreg.	203	349	214	187	s. 10 e.	149
Chattanooga, Tenn.	242	210	180	261	n. 68 w.	86	Boise, Idaho.	184	218	221	289	s. 63 w.	76
Knoxville, Tenn.	294	195	132	284	n. 57 w.	182	Lewiston, Idaho †	25	89	230	68	s. 68 e.	174
Memphis, Tenn.	247	257	209	199	s. 45 e.	14	Pocatello, Idaho.	66	332	228	278	s. 10 w.	270
Nashville, Tenn.	254	244	231	231	n. 81 w.	60	Spokane, Wash.	143	315	236	185	s. 17 e.	180
Lexington, Ky. †	73	157	99	119	s. 13 w.	43	Walla Walla, Wash.	81	471	67	198	s. 19 w.	410
Louisville, Ky.	223	262	157	224	s. 60 w.	77	<i>North Pacific Coast Region.</i>						
Evansville, Ind. †	120	135	108	83	s. 59 e.	29	North Head, Wash.						
Indianapolis, Ind.	240	271	132	240	s. 74 w.	112	Port Crescent, Wash. *	5	79	124	205	s. 48 w.	110
Cincinnati, Ohio.	205	227	238	263	s. 47 w.	33	Seattle, Wash.	201	300	240	144	s. 44 e.	138
Columbus, Ohio.	182	248	187	275	s. 58 w.	110	Tacoma, Wash.	237	300	81	248	s. 21 w.	179
Pittsburg, Pa.	274	210	155	294	n. 65 w.	132	Tatoosh Island, Wash.						
Parkersburg, W. Va.	213	245	168	245	s. 68 w.	83	Astoria, Oreg.						
Elkins, W. Va.	214	194	80	333	n. 85 w.	254	Portland, Oreg.	206	270	167	253	s. 53 w.	107
<i>Lower Lake Region.</i>							Roseburg, Oreg.	254	186	171	239	n. 45 w.	96
Buffalo, N. Y.	141	238	160	336	s. 61 w.	201	Eureka, Cal.	227	275	154	222	s. 55 w.	88
Oswego, N. Y.	157	313	159	247	s. 29 w.	179	Mount Tamalpais, Cal.	292	167	73	397	n. 69 w.	343
Rochester, N. Y.	131	267	140	366	s. 59 w.	269	<i>South Pacific Coast Region.</i>						
Syracuse, N. Y.							Red Bluff, Cal.	294	264	227	103	s. 76 e.	127
Erie, Pa.	208	216	121	326	s. 87 w.	200	Sacramento, Cal.	131	405	260	108	s. 29 e.	314
Cleveland, Ohio.	190	296	190	225	s. 77 w.	112	San Francisco, Cal.	98	186	73	485	s. 79 w.	422
Sandusky, Ohio. †	84	133	78	160	s. 60 w.	97	<i>South Pacific Coast Region.</i>						
Toledo, Ohio.	168	241	175	306	s. 61 w.	130	Fresno, Cal.	330	82	123	399	n. 48 w.	371
Detroit, Mich.	209	213	179	299	s. 88 w.	120	Los Angeles, Cal.	163	136	169	388	n. 88 w.	220
<i>Upper Lake Region.</i>							San Diego, Cal.	304	190	125	345	n. 51 w.	238
Alpena, Mich.	234	218	170	283	n. 82 w.	113	San Luis Obispo, Cal.	266	140	25	324	n. 67 w.	326
Escanaba, Mich.	256	256	108	263	w.	156	<i>West Indies.</i>						
Grand Haven, Mich.	220	236	179	259	s. 79 w.	82	Basseterre St. Kitts, W. I.	169	74	584	14	n. 80 e.	578
Houghton, Mich. †	94	67	134	137	n. 6 w.	27	Bridgetown, Barbados.	88	95	652	2	s. 89 e.	650
Marquette, Mich.	249	210	120	318	n. 79 w.	204	Havana, Cuba.	171	96	517	50	n. 81 e.	471
Port Huron, Mich.	240	240	148	274	w.	126	Puerto Principe, Cuba.	298	69	486	44	n. 62 e.	496
Sault Ste. Marie, Mich.	188	191	236	282	s. 86 w.	46	San Juan, Porto Rico.	35	307	493	35	s. 60 e.	538
Chicago, Ill.	213	241	188	262	s. 69 w.	79	Santiago de Cuba, Cuba.	472	136	166	73	n. 16 e.	350
Milwaukee, Wis.	215	204	155	315	d. 84 w.	60							
Green Bay, Wis.	196	293	169										

**TABLE III.—Total number of days with thunderstorms at selected stations, 1902.**

State and station.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
Alabama.													
Mobile	0	4	3	2	6	4	11	7	4	3	3	0	45
Montgomery	2	3	7	2	10	5	13	9	3	1	1	2	57
Scottsboro	0	3	5	2	5	11	16	9	3	1	1	0	55
Arizona.													
Flagstaff	0	0	1	0	0	0	2	8	0	0	0	0	11
Fort Defiance	0	0	0	0	0	0	0	4	0	1	0	0	0
Phoenix	0	0	0	0	0	1	5	5	6	0	0	0	17
Showlow	0	0	0	0	3	1	3	7	7	0	1	0	22
Yuma	0	0	0	0	0	0	2	0	0	0	0	0	0
Arkansas.													
Blanchard	3	3	4	4	5	2	4	0	0	0	2	2	26
Little Rock	1	2	8	8	4	11	5	4	4	1	1	1	50
Pocahontas	1	3	2	6	10	6	3	7	2	0	1	1	42
Fort Smith	0	2	4	5	8	6	6	8	7	2	1	1	52
California.													
Eureka	0	3	1	0	0	0	0	0	0	0	1	0	5
Fresno	0	0	1	1	0	0	0	1	0	0	0	1	4
Independence	0	0	0	1	0	0	2	0	0	0	0	0	10
Los Angeles	0	0	0	0	0	0	0	0	0	0	0	0	0
Mount Tamalpais	0	0	1	0	0	0	0	0	0	0	0	0	1
Red Bluff	0	0	0	1	0	0	0	0	0	0	1	0	0
Sacramento	0	0	0	0	0	0	0	0	0	0	0	0	3
San Diego	1	0	0	0	1	0	0	0	0	0	0	0	4
San Francisco	0	0	0	0	0	0	0	0	0	0	0	0	2
San Luis Obispo	1	1	0	0	1	0	0	0	0	0	0	0	3
Colorado.													
Denver	0	1	1	1	8	8	3	13	1	2	0	0	39
Durango	0	0	0	0	0	0	0	0	1	1	0	0	0
Grand Junction	0	0	0	2	3	2	7	8	1	3	0	0	29
Pueblo	0	0	1	0	7	9	7	14	1	1	0	0	40
Connecticut													
Hartford	0	1	1	2	6	7	9	3	2	0	0	2	26
New Haven	0	1	0	1	5	5	9	7	8	1	1	0	20
District of Columbia.													
Washington	0	1	1	2	9	7	14	9	8	1	1	0	48
Florida.													
Jacksonville	0	3	6	5	9	11	20	13	18	2	1	3	86
Jupiter	0	4	1	5	7	8	15	11	11	10	3	1	77
Key West	0	2	0	4	3	2	5	6	2	5	0	0	30
Merritt Island	0	2	4	2	6	14	23	24	26	13	3	1	117
Myers	0	2	1	1	14	17	31	24	31	18	2	1	142
Pensacola	0	4	6	8	8	16	7	7	2	3	3	1	73
Tampa	0	3	2	2	9	6	13	15	13	3	0	1	67
Georgia.													
Atlanta	0	2	5	4	12	7	14	15	4	0	1	0	64
Augusta	0	1	1	3	5	6	10	12	3	0	0	0	41
Clayton	0	1	1	1	16	9	16	8	3	0	0	1	54
Macon	0	1	3	4	10	5	13	12	1	1	1	0	50
Poulau	0	4	2	2	5	7	4	1	1	1	1	2	34
Savannah	1	2	3	5	8	9	20	9	6	1	1	2	67
Idaho.													
Boise	0	0	0	0	1	1	1	2	1	0	0	1	7
Downey	0	0	0	0	2	2	2	1	0	0	0	0	0
Lewiston	0	0	0	1	1	1	0	0	0	0	0	0	10
Murray	0	0	0	1	3	3	2	0	0	0	0	0	4
Ola	0	1	0	0	2	1	1	0	0	0	0	0	6
Pocatello	0	0	0	0	2	2	1	3	5	0	0	0	11
Illinois.													
Cairo	0	1	6	7	8	8	6	10	2	0	1	1	50
Chicago	0	0	1	1	14	10	9	4	2	3	0	0	44
Cisne	0	0	1	2	9	10	6	4	0	0	0	0	32
Peoria	0	0	0	3	0	4	8	4	5	3	0	0	27
Rantoul	0	0	3	5	6	14	13	5	2	0	0	0	56
Springfield	0	0	4	8	10	11	10	8	4	1	2	1	59
Winnebago	0	0	1	2	1	0	9	2	2	1	0	0	18
Indiana.													
Butterville	0	1	2	2	6	7	5	4	2	2	2	0	33
Cambridge City	0	0	2	2	5	12	4	3	3	1	0	0	47
Evanville	0	0	3	6	7	12	6	6	2	1	0	2	45
Huntington	0	0	3	3	6	7	9	2	4	5	0	1	40
Indianapolis	0	0	2	3	8	10	8	3	1	3	2	1	41
Worthington	0	0	2	2	6	10	6	4	2	1	0	1	34
Iowa.													
Davenport	0	0	0	2	11	10	14	6	2	4	0	0	49
Des Moines	0	4	3	11	11	11	12	12	5	1	0	0	60
Dubuque	0	0	3	11	11	11	10	4	4	4	0	0	50
Keokuk	0	0	1	5	8	11	12	10	3	2	1	0	53
Sioux City	0	0	2	3	4	6	11	6	3	1	0	0	36
Kansas.													
Concordia	0	0	1	3	6	14	11	13	3	2	1	0	54
Dodge	0	0	2	0	9	10	9	9	3	1	2	0	45
Topeka	0	0	4	3	10	7	7	12	2	0	1	0	47
Wichita	0	0	1	3	12	12	9	10	7	1	0	0	55
Kentucky.													
Lexington	0	0	1	1	9	10	9	7	0	2	0	2	41
Louisville	1	1	1	4	9	12	10	6	1	2	0	1	48
Louisiana.													
Grand Coteau	0	3	3	2	2	1	1	4	0	0	0	2	18
New Orleans	0	4	4	4	7	5	2	19	11	1	1	2	72
Shreveport	1	1	3	7	8	15	3	3	6	2	1	2	52
Maine.													
Eastport	0	0	0	1	2	3	3	3	0	1	0	0	13
Farmington	0	1	2	5	1	1	1	5	2	1	0	0	19
Orono	0	0	1	3	2	0	1	3	0	1	0	0	11
Portland	0	1	0	1	2	3	2	3	1	1	0	0	14
Maryland.													
Baltimore	1	1	1	2	4	7	11	8	2	0	1	0	38
Grantsville	0	1	1	2	9	10	9	6	2	0	0	0	44
Princess Anne	0	1	3	2	6	4	9	6	1	1	0	0	33
Boston	0	0	0	2	1	3	3	6	0	0	0	0	15

TABLE III.—*Total number of days with thunderstorms, etc.*—Continued.

State and station.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
<i>Massachusetts—Con.</i>													
Monson . . . . .	0	0	0	0	3	0	5	2	0	0	0	0	0
Nantucket . . . . .	0	0	0	1	1	2	3	6	3	0	0	0	14
New Bedford . . . . .	0	0	1	4	0	1	1	5	0	1	1	0	11
Williamstown . . . . .	0	0	1	2	1	1	1	3	0	1	1	0	12
<i>Michigan.</i>													
Alpena . . . . .	0	0	1	1	7	6	9	4	3	1	0	0	32
Detroit . . . . .	0	0	3	3	9	8	14	4	3	3	0	0	46
Escanaba . . . . .	0	0	0	1	11	3	8	2	2	2	0	0	21
Grand Haven . . . . .	0	0	1	2	3	3	10	2	0	0	0	0	35
Houghton . . . . .	0	0	1	2	3	2	6	1	0	0	0	0	20
Lansing . . . . .	0	0	12	12	12	12	12	12	12	3	3	0	40
Marquette . . . . .	0	0	0	0	1	1	7	0	0	1	1	0	13
Port Huron . . . . .	0	0	0	0	2	2	11	3	0	0	0	0	36
Sault Ste. Marie . . . . .	0	0	0	0	2	2	6	1	0	0	0	0	14
<i>Minnesota.</i>													
Duluth . . . . .	0	0	1	1	4	3	10	6	3	3	0	0	32
Minneapolis . . . . .	0	0	1	2	7	6	10	6	5	4	0	0	42
Moorhead . . . . .	0	0	0	1	2	1	5	2	1	0	0	0	31
Rolling Green . . . . .	0	0	0	1	2	3	8	3	1	0	0	0	12
St. Cloud . . . . .	0	0	0	0	2	3	11	5	5	2	0	0	0
St. Paul . . . . .	0	0	0	0	8	3	11	5	5	3	0	0	37
<i>Mississippi.</i>													
Biloxi . . . . .	0	3	3	1	3	5	5	5	5	1	1	1	28
Meridian . . . . .	0	3	8	4	14	11	11	11	11	2	1	1	54
Vicksburg . . . . .	0	2	7	5	17	17	7	12	12	3	1	1	31
Water Valley . . . . .	0	4	5	12	5	6	4	1	3	0	0	1	31
<i>Missouri.</i>													
Columbia . . . . .	0	0	2	4	13	15	10	13	5	2	1	0	65
Hannibal . . . . .	0	0	1	7	11	10	7	12	3	3	1	1	55
Kansas City . . . . .	0	0	3	3	9	10	9	12	6	1	0	0	58
St. Louis . . . . .	0	0	5	5	9	9	10	10	3	4	1	1	58
Springfield . . . . .	0	1	4	9	13	11	9	9	4	3	1	1	60
<i>Montana.</i>													
Havre . . . . .	0	0	0	0	4	6	2	4	0	0	0	0	16
Helena . . . . .	0	0	0	0	9	4	3	8	0	0	0	0	24
Kalispell . . . . .	0	0	0	0	3	3	2	2	1	0	0	0	11
Miles City . . . . .	0	0	0	0	6	4	4	4	0	0	0	0	16
Parrot . . . . .	0	0	0	1	3	2	2	5	0	1	1	0	10
<i>Nebraska.</i>													
Lincoln . . . . .	0	0	4	4	9	10	16	8	4	3	1	0	59
North Platte . . . . .	0	0	1	5	8	9	9	8	5	1	0	0	37
Omaha . . . . .	0	0	5	3	11	11	11	11	5	3	0	0	64
Valentine . . . . .	0	0	2	3	3	8	6	12	5	2	0	0	35
<i>Nevada.</i>													
Bethlehem . . . . .	0	0	0	0	0	0	1	5	1	1	2	0	7
Nashua . . . . .	0	0	0	1	2	2	1	4	1	1	1	0	15
<i>New Jersey.</i>													
Atlantic City . . . . .	0	1	1	2	3	3	8	6	3	1	1	0	34
Cape May . . . . .	0	1	3	2	5	7	8	6	1	0	0	0	33
Somerville . . . . .	0	1	1	0	12	4	10	11	1	0	0	0	30
<i>New Mexico.</i>													
Roswell . . . . .	0	0	0	0	5	3	8	9	0	2	0	0	27
Santa Fe . . . . .	0	0	1	9	4	16	11	11	5	2	0	0	49
<i>New York.</i>													
Albany . . . . .	0	0	1	2	1	5	7	5	2	5	0	0	28
Binghamton . . . . .	0	1	2	0	6	8	12	8	4	2	0	0	43
Buffalo . . . . .	0	0	1	1	4	2	8	6	3	6	0	0	31
New York . . . . .	0	0	0	1	8	9	9	9	2	5	0	0	35
Oswego . . . . .	0	0	0	3	5	9	9	3	2	5	0	0	27
Rochester . . . . .	0	0	0	2	3	7	8	2	1	4	0	0	34
South Canisteo . . . . .	0	1	1	0	6	3	12	6	1	4	0	0	13
<i>North Carolina.</i>													
Ashers . . . . .	0	0	1	1	10	13	11	10	3	0	1	0	50
Charlotte . . . . .	0	2	5	7	8	12	11	11	4	1	0	0	63
Hatteras . . . . .	0	2	2	1	5	7	3	1	1	1	0	0	30
Raleigh . . . . .	0	1	2	1	7	9	10	9	5	0	0	0	44
Wilmington . . . . .	1	2	3	2	8	10	7	10	5	0	1	0	49
<i>North Dakota.</i>													
Amenia . . . . .	0	0	0	0	4	2	3	3	0	1	0	0	13
Bismarck . . . . .	0	0	0	1	5	9	7	7	1	0	0	0	38
Williston . . . . .	0	0	0	0	2	3	1	4	0	1	0	0	11
<i>Ohio.</i>													
Cincinnati . . . . .	0	1	1	3	7	14	8	4	1	2	0	0	41
Cleveland . . . . .	0	0	1	2	4	10	14	4	2	3	0	0	40
Columbus . . . . .	0	1	3	1	4	10	7	3	4	2	2	0	35
Sandusky . . . . .	0	0	2	0	6	7	11	3	2	4	0	0	32
Toledo . . . . .	0	0	0	1	8	9	12	4	3	1	0	0	41
<i>Oklahoma.</i>													
Oklahoma . . . . .	0	0	3	5	11	6	5	6	4	0	0	0	43
Perry . . . . .	0	0	1	3	6	4	1	2	0	0	0	0	17
<i>Oregon.</i>													
Astoria . . . . .	1	1	0	0	0	0	0	0	0	0	0	0	2
Baker City . . . . .	0	0	0	0	4	0	1	2	0	0	0	0	7
Portland . . . . .	0	0	0	0	1	0	2	1	0	0	0	0	4
Roseburg . . . . .	0	0	0	1	1	0	0	0	0	0	0	0	2
<i>Pennsylvania.</i>													
Erie . . . . .	0	1	0	0	8	4	8	3	1	3	0	0	28
Harrisburg . . . . .	0	1	1	0	5	15	6	1	0	0	0	0	33
Philadelphia . . . . .	0	1	3	1	3	8	13	0	1	0	0	0	39
Pittsburg . . . . .	0	0	2	3	8	6	11	2	0	0	0	0	37
Scranton . . . . .	0	1	0	0	4	7	11	6	0	0	0	0	29
Wellsboro . . . . .	0	0	1	0	4	5	9	5	2	2	0	0	28
<i>Rhode Island.</i>													
Block Island . . . . .	0	1	0	2	1	3	6	4	2	0	0	0	19
Narragansett . . . . .	0	0	0	2	1	2	1	4	4	0	0	0	12
<i>South Carolina.</i>													
Charleston . . . . .	0	4	3	6	11	11	24	18	8	0	0	0	87
Columbia . . . . .	0	2	6	8	7	12	15	15	2	0	0	0	55

TABLE III.—Total number of days with thunderstorms, etc.—Continued.

State and station.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
<i>South Dakota.</i>													
Huron	0	0	0	4	5	7	12	11	2	3	0	0	45
Pierre	0	0	1	1	6	12	14	5	0	0	0	0	48
Rapid City	0	0	1	1	6	6	8	5	0	0	0	0	27
<i>Tennessee.</i>													
Chattanooga	0	9	6	3	10	13	15	13	2	0	1	0	65
Knoxville	0	0	4	0	6	12	5	11	3	0	0	0	36
Memphis	0	3	5	6	9	5	3	3	1	0	0	0	45
Nashville	0	0	4	5	6	11	7	8	2	1	0	0	45
<i>Texas.</i>													
Abilene	0	0	3	4	10	6	9	2	3	1	3	0	41
Amarillo	0	0	2	3	10	4	6	13	3	2	1	0	44
Corpus Christi	0	1	1	2	5	1	3	0	8	3	4	1	36
El Paso	1	0	0	0	0	3	2	12	3	2	1	0	24
Fort Worth	0	1	4	6	6	4	13	3	5	1	3	0	46
Galveston	0	2	2	4	5	0	11	0	6	4	2	2	42
Palestine	0	1	4	6	6	1	14	1	7	3	4	1	48
San Antonio	0	0	1	3	4	1	10	0	9	2	5	0	35
<i>Utah.</i>													
Grover	0	0	0	1	1	0	1	3	2	0	0	0	8
Modena	0	0	0	1	1	2	5	10	3	2	0	0	24
Salt Lake City	0	1	0	1	6	4	4	4	2	1	0	0	24
<i>Vermont.</i>													
Northfield	0	0	0	0	3	3	5	6	7	4	3	0	29
Jacksonville	0	0	0	0	3	5	6	6	8	3	0	0	33
<i>Virginia.</i>													
Cape Henry	1	1	0	1	8	7	7	10	5	0	0	0	40
Dale Enterprise	0	1	3	2	6	7	8	7	2	1	0	0	37
Lynchburg	0	1	0	2	8	7	7	6	0	1	0	0	32
Norfolk	1	1	0	1	7	7	8	7	2	0	0	0	34
Richmond	0	1	2	2	8	8	8	11	3	0	0	0	27
Wytheville	0	1	1	1	9	8	4	1	12	0	0	0	27
<i>Washington.</i>													
Neah Bay	0	1	1	0	0	0	0	0	0	0	0	0	2
Port Crescent	0	0	0	0	0	0	0	0	0	0	0	0	0
Seattle	0	0	0	2	2	1	2	0	0	0	1	0	8
Spokane	0	0	0	2	0	3	0	0	0	0	0	0	5
Tacoma	0	0	0	1	0	0	0	1	0	0	0	0	3
Walla Walla	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>West Virginia.</i>													
Elkins	0	1	2	1	6	10	11	8	2	0	0	0	41
Parkersburg	0	0	3	1	9	9	9	6	4	2	0	0	43
Upper Tract	0	1	0	0	9	12	14	6	2	0	0	0	44
<i>Wisconsin.</i>													
Green Bay	0	0	2	2	6	7	6	2	3	1	1	0	30
La Crosse	0	0	3	4	11	7	7	4	2	2	1	0	42
Milwaukee	0	0	1	2	11	7	12	3	2	2	0	0	40
<i>Wyoming.</i>													
Cheyenne	0	0	2	1	5	10	17	12	2	0	0	0	49
Fourbear	0	0	0	0	8	5	8	8	2	1	0	0	39
Lander	0	0	0	0	3	1	2	2	0	0	0	0	8

\* These values from Missoula; no report from Ovando.

† These values from Twin Bridges; no report from Parrot.

TABLE IV.—Number of days on which thunderstorms were reported, 1902.

States.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
Alabama	5	8	18	12	22	17	27	22	15	4	4	9	163
Arizona	1	1	4	1	6	10	18	25	19	4	5	9	96
Arkansas	6	7	14	20	20	13	24	20	16	7	7	12	161
California	2	7	9	3	8	2	10	17	10	6	8	8	99
Colorado	1	2	8	7	27	24	22	30	12	10	3	0	146
Connecticut	0	1	5	5	12	12	18	16	6	6	3	0	84
Delaware	0	1	0	2	5	7	15	9	1	0	0	0	40
Dist. of Columbia	0	1	2	9	7	14	9	3	1	1	0	0	48
Florida	0	9	18	11	29	28	30	30	31	27	9	6	223
Georgia	5	8	10	11	25	23	30	26	14	4	5	5	135
Idaho	0	1	1	8	16	14	14	12	4	5	0	2	77
Illinois	0	3	15	15	26	24	26	23	19	10	9	4	174
Indiana	1	2	11	14	25	29	27	18	14	12	4	4	161
Indian Territory	4	3	8	12	20	7	11	13	5	6	1	0	103
Iowa	0	1	12	16	27	26	30	25	19	16	1	2	175
Kansas	0	3	5	22	22	26	24	24	14	10	8	1	150
Kentucky	3	1	13	18	21	21	28	15	10	6	1	4	133
Louisiana	2	8	17	16	25	10	31	31	21	12	8	12	138
Maine	0	2	8	9	10	9	14	12	4	6	5	0	65
Maryland	1	2	9	8	16	22	20	18	14	8	5	3	113
Massachusetts	0	1	2	8	9	8	14	16	6	6	0	0	70
Michigan	0	0	8	10	21	21	30	30	16	16	3	0	143
Minnesota	0	1	4	13	22	22	29	20	20	9	2	0	142
Mississippi	3	9	18	17	22	17	31	26	15	7	8	4	172
Missouri	0	7	16	20	26	28	25	29	16	18	5	5	195
Montana	0	1	0	8	23	22	27	14	19	4	1	0	97
Nebraska	0	1	18	14	27	28	29	29	16	14	6	2	184
Nevada	0	0	1	3	7	3	11	17	5	2	0	0	49
New Hampshire	1	1	1	4	7	9	7	12	5	6	0	0	53
New Jersey	0	3	7	10	12	17	22	22	5	5	1	0	104
New Mexico	1	4	6	2	19	17	24	27	7	8	1	2	118
New York	0	2	10	12	18	19	28	21	11	16	2	2	141
North Carolina	2	3	15	14	23	27	28	21	11	8	8	4	164
North Dakota	0	7	5	14	20	21	16	7	6	7	0	0	96
Ohio	1	2	11	13	17	28	27	17	12	13	3	2	146
Oklahoma	0	0	10	8	22	9	8	10	8	5	5	0	97
Oregon	2	18	5	17	13	4	5	13	2	5	9	3	96
Pennsylvania	0	1	9	11	16	23	27	20	10	10	1	0	182

TABLE IV.—Number of days on which thunderstorms were reported—Cont'd.

States.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
Rhode Island	0	5	8	9	15	25	25	25	10	11	3	3	48
South Carolina	0	9	1	14	19	23	23	25	23	22	2	3	125
South Dakota	0	0	2	3	14	18	24	24	22	23	3	3	156
Tennessee	2	6	10	13	19	24	25	25	23	22	1	2	208
Texas	6	1	3	2	4	18	18	8	16	22	9	7	96
Utah	1	3	2	0	7	8	8	12	13	9	7	6	66
Vermont	0	2	2	2	7	9	11	11	11	11	0	0	127
Virginia	2	3	7	2	11	11	11	11	11	11	3	3	122
Washington	0	1	2	4	9	24	21	25	17	14	12	0	122
West Virginia	1	1	1	3	0	0	0	0	0	0	1	0	10
Wisconsin	0	0	1	0	0	0	0	0	0	0	0	0	8
Wyoming	0	3	7	10	23	17	24	22	17	24	22	1	112
Total	61	168	395	514	912	871	1064	977	556	392	178	118	6206

TABLE VI.—*Annual climatological summary—Continued.*

Stations.	Pressure.*		Temperature.			Precipita-	Total	Total depth of
	Mean not re-	Mean reduced.	Departure from	Departure from	Maxi-	Minim.	Departure from	fall.
	Ins.	Ins.	o	o	o	Ins.	Ins.	Ins.
Chatham, N. B.	20.87	29.89	-0.05	41.2	+2.5	51.3	31.0	46.65
Father Point, Que.	29.88	29.90	-0.03	36.7	+1.9	44.9	29.0	44.23
Quebec, Que.	29.61	29.94	-0.04	39.7	+1.5	47.7	31.7	46.39
Montreal, Que.	29.75	29.98	-0.03	43.0	+1.5	50.1	35.6	46.16
Bissett, Ont.	29.37	29.99	0.00	38.6	+0.4	51.0	26.2	32.94
Ottawa, Ont.	29.69	30.02	+0.02	42.6	+2.0	51.6	33.6	35.96
Kingston, Ont.	29.65	29.97	-0.04	44.2	+1.1	52.2	36.3	30.44
Toronto, Ont.	29.60	29.98	-0.04	46.0	+1.8	54.5	37.4	31.07
White River, Ont.	28.64	29.98	0.00	34.0	+2.1	46.1	21.6	28.49
Port Stanley, Ont.	29.33	30.00	-0.06	45.4	+0.7	53.7	37.2	32.59
Saugeen, Ont.	29.27	29.99	-0.02	44.8	+2.4	53.1	36.5	34.72
Parry Sound, Ont.	29.27	29.97	-0.03	42.6	+2.4	52.4	32.8	45.23
Port Arthur, Ont.	29.26	29.98	-0.02	37.0	+2.6	45.8	28.1	21.82
Winnipeg, Man.	29.12	29.96	-0.04	37.6	+4.5	48.6	26.6	20.92
Minnedosa, Man.	28.14	29.96	-0.03	36.0	+4.4	47.2	24.8	19.30
Qu'Appelle, Assin.	27.66	29.95	-0.03	35.7	+2.4	45.9	25.5	24.37
Medicine Hat, Assin.	27.65	29.95	-0.03	41.4	+1.1	54.0	28.9	13.68
Swift Current, Assin.	27.35	29.96	-0.01	38.4	+0.9	48.0	27.8	17.64
Calgary, Alberta.	26.33	29.89	-0.04	37.0	-0.2	48.1	25.8	34.57
Banff, Alberta.	25.28	29.92	-0.01	34.8	0.1	45.4	24.2	30.59
Edmonton, Alberta.	27.58	29.90	-0.03	36.9	+1.3	47.5	26.3	20.66
Prince Albert, Sask.	28.34	29.92	-0.06	33.2	+2.7	44.4	22.1	20.01
Battleford, Sask.	28.19	29.96	-0.01	34.3	+1.6	45.4	23.2	13.49
Kamloops, B. C.	28.68	29.90	-0.03	47.2	+0.1	56.3	37.4	34.10
Victoria, B. C.	29.80	29.99	-0.01	50.2	+1.6	55.9	44.5	36.45
Barkerville, B. C.	25.57	29.89	-0.01	35.5	-0.7	45.4	25.6	32.23
Hamilton, Bermuda	29.82	29.98	-0.11	69.6	0.1	74.6	64.5	87.64

\* Reduced to standard gravity and to the mean of twenty-four hourly observations, for the snow year, July 1, 1901, to June 30, 1902.

TABLE VII.—*Heights of rivers referred to zeros of gages, 1902.*

Stations.	Highest water.		Lowest water.		Mean stage.	Annual range.
	Stage.	Date.	Stage.	Date.		
<i>Mississippi River.</i>						
St. Paul, Minn. (1).	7.5	May 26, 27...	1.1	Mar. 10...	3.1	6.4
Reeds Landing, Minn.	5.4	Nov. 19, 20...	-0.6	Feb. 18-23...	1.9	6.0
La Crosse, Wis. (2).	7.7	May 23...	1.4	Aug. 30...	3.6	6.3
Prairie du Chien, Wis. (1).	10.8	May 24...	0.9	Aug. 31, Sept. 1...	4.0	9.9
Dubuque, Iowa (3).	12.6	May 24...	1.6	Sept. 1-3...	4.8	11.0
Leclaire, Iowa (3).	8.0	May 26, 27...	0.8	Sept. 3-5...	3.0	7.2
Davenport, Iowa (3).	10.4	May 26-28...	1.8	Sept. 3-5...	4.4	8.6
Muscatine, Iowa	12.0	May 28, 29...	2.3	Sept. 4-6...	5.0	9.7
Galland, Iowa (4).	7.5	July 21, 22...	1.0	Apr. 23, 24; May 2...	3.2	6.5
Keokuk, Iowa (3).	15.5	July 21...	1.0	Apr. 23, 24; May 2...	5.7	14.5
Hannibal, Mo (3).	16.6	July 23...	1.9	Apr. 23, 24...	6.8	14.7
Grafton, Ill.	20.4	July 26...	0.8	Jan. 29...	8.7	19.6
St. Louis, Mo (4).	26.9	July 26...	-1.2	Jan. 30...	13.6	28.7
Chester, Ill.	22.8	July 27...	-1.4	Jan. 30, 31...	10.1	24.2
New Madrid, Mo.	33.2	Mar. 17, 18...	6.9	Sept. 27...	18.2	26.3
Memphis, Tenn.	30.8	Mar. 20, 21...	3.0	Sept. 28, 29...	14.6	27.8
Helena, Ark.	39.6	Mar. 23, 24...	6.3	Sept. 30...	21.0	33.3
Arkansas City, Ark.	41.4	Mar. 28, 29...	6.8	Oct. 1...	23.3	34.6
Greenville, Miss.	36.0	Mar. 29...	6.0	Oct. 1...	19.4	30.0
Vicksburg, Miss.	41.2	April 17, 18...	4.8	Oct. 3...	21.6	36.4
New Orleans, La.	14.9	April 19...	3.6	Nov. 15...	7.6	11.3
<i>Missouri River.</i>						
Bismarck, N. Dak.	9.6	Mar. 19, 20...	0.4	(Feb. 15, Oct. 15,	3.7	9.2
Pierre, S. Dak. (1).	9.2	June 10...	-0.2	Dec. 1-4...	4.4	9.4
Sioux City, Iowa (1).	12.4	June 12...	4.7	Mar. 19, Nov. 30...	8.1	7.7
Omaha, Neb. (1).	12.4	June 14...	4.4	Dec. 4...	8.4	8.0
St. Joseph, Mo.	9.4	July 13...	-2.1	Dec. 16...	3.4	11.5
Kansas City, Mo (2).	23.2	July 15...	3.5	Dec. 15...	10.9	19.7
Booneville, Mo (2).	18.6	July 15, 16...	4.8	Dec. 19...	10.1	13.8
Hermann, Mo (2).	18.0	July 3...	1.7	Jan. 20...	9.7	16.3
<i>Illinois River.</i>						
Peoria, Ill.	21.0	July 22...	6.8	Jan. 23-27...	11.9	14.2
Youghiogheny River.				Sept. 21-25; Nov.	2.0	9.8
Confluence, Pa.	10.1	Feb. 28...	0.3	11-24...		
West Newton, Pa (3).	22.0	Feb. 28...	0.0	Sept. 4-6, 16-24,	2.3	22.0
Allegheny River.				{ 26, 27...		
Warren, Pa.	13.5	Mar. 2...	-0.3	Sept. 21-30...	2.0	13.8
Oil City, Pa.	15.3	Mar. 2...	0.2	Sept. 22-24...	3.0	15.1
Parker, Pa.	18.0	Mar. 1, 2...	-0.2	Sept. 18-24...	2.9	18.2
Monongahela River.				{ Sept. 19-24...		
Weston, W. Va.	11.2	Jan. 27...	-1.2	{ Oct. 25-27...	0.6	12.4
Fairmont, W. Va.	18.8	Dec. 13...	0.7	{ Sept. 19-26...	3.1	18.1
Greensburg, Pa.	22.7	Mar. 1...	6.0	{ Sept. 19-21...	8.6	16.7
Lock No. 4, Pa.	29.5	Mar. 1...	5.9	{ Sept. 30, Oct. 29...	9.6	23.6
Conemaugh River.				{		
Johnstown, Pa.	10.8	Mar. 1...	0.4	Sept. 21-24...	2.4	10.4
Red Bank Creek.						
Brookville, Pa.	6.7	Mar. 1...	-0.5	Sept. 20-Nov. 25	0.8	7.2

TABLE VII.—*Heights of rivers referred to zeros of gages, 1902—Continued.*

Stations.	Highest water.		Lowest water.		Mean stage.	Annual range.
	Stage.	Date.	Stage.	Date.		
<i>Beaver River.</i>						
Ellwood Junction, Pa (3).	10.0	Mar. 1....	2.1	Sept. 7-29....	3.6	7.9
<i>Great Kanawha River.</i>						
Charleston, W. Va.	33.0	Mar. 1....	3.8	June 3....	7.4	29.2
<i>Little Kanawha River.</i>						
Glenville, W. Va.	16.2	Dec. 16....	-2.6	Nov. 10-12....	1.0	18.8
<i>New River.</i>						
Hinton, W. Va.	17.0	Mar. 1....	1.0	Sept. 1-5....	2.7	16.0
<i>Cheat River.</i>						
Rowlesburg, W. Va (4).	10.0	Mar. 1....	-0.4	Sept. 25....	3.1	10.4
<i>Ohio River.</i>						
Pittsburg, Pa.	30.3	Mar. 2....	1.2	Jan. 15....	6.9	29.1
Davis Island, Dam, Pa.	29.0	Mar. 2....	1.7	Sept. 20....	6.5	27.3
Wheeling, W. Va.	42.0	Mar. 2, 3...	1.1	Sept. 22....	8.6	40.9
Parkersburg, W. Va.	40.0	Mar. 4....	1.9	Sept. 24-26....	9.7	38.1
Point Pleasant, W. Va.	46.3	Mar. 3....	1.0	Sept. 25, 26....	10.9	45.3
Huntington, W. Va.	49.5	Mar. 3....	3.3	Sept. 22-26....	14.5	46.2
Catlettsburg, Ky.	50.6	Mar. 2....	0.8	Sept. 23-25....	13.8	49.6
Portsmouth, Ohio	50.3	Mar. 3, 4...	2.5	Sept. 25, 26....	15.0	47.8
Cincinnati, Ohio	50.9	Mar. 5....	3.9	Sept. 24, 25....	16.1	47.0
Madison, Ind.	41.8	Mar. 8....	3.5	Sept. 27....	15.1	38.3
Louisville, Ky.	24.8	Mar. 9....	2.7	Sept. 7, 8....	7.8	22.1
Evansville, Ind.	40.0	Mar. 11, Dec. 22...	1.7	Sept. 24....	13.9	38.3
Paducah, Ky.	39.7	Mar. 15, 16...	1.4	Sept. 17, 18, 23-26....	14.3	38.3
Cairo, Ill.	42.2	Mar. 17....	7.3	Sept. 26....	22.0	34.9
<i>Muskkingum River.</i>						
Zanesville, Ohio	17.2	Dec. 17....	5.3	Sept. 18-24....	7.9	11.9
<i>Scioto River.</i>						
Columbus, Ohio (3).	9.0	Dec. 17....	2.0	Apr. 30-May 23....	3.0	7.0
<i>Miami River.</i>						
Dayton, Ohio	6.7	Dec. 17....	0.1	Sept. 7-14, 17, 20-25....	1.4	6.6
<i>Wabash River.</i>						
Mt. Carmel, Ill. (2).	17.0	Dec. 25....	1.0	Sept. 25, 26....	5.4	16.0
<i>Licking River.</i>						
Falmouth, Ky.	28.2	Dec. 16....	0.1	Sept. 4-13, 18-23....	3.7	28.1
Frankfort, Ky.	28.8	Jan. 31....	5.0	Sept. 18-27....	7.8	23.8
Speer's Ferry, Va.	23.6	Mar. 1....	-0.8	(Aug. 30, 31, Sept. 2, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 229, 230, 231, 231, 232, 233, 234, 235, 236, 237, 238, 239, 239, 240, 241, 241, 242, 243, 244, 244, 245, 245, 246, 246, 247, 247, 248, 248, 249, 249, 250, 250, 251, 251, 252, 252, 253, 253, 254, 254, 255, 255, 256, 256, 257, 257, 258, 258, 259, 259, 260, 260, 261, 261, 262, 262, 263, 263, 264, 264, 265, 265, 266, 266, 267, 267, 268, 268, 269, 269, 270, 270, 271, 271, 272, 272, 273, 273, 274, 274, 275, 275, 276, 276, 277, 277, 278, 278, 279, 279, 280, 280, 281, 281, 282, 282, 283, 283, 284, 284, 285, 285, 286, 286, 28		

TABLE VII.—Heights of rivers referred to zeros of gages, 1902—Continued.

Stations.	Highest water.		Lowest water.		Mean stage.	Annual stage.
	Stage.	Date.	Stage.	Date.		
Cape Fear River. Fayetteville, N. C.	Feet, 41.7	Mar. 2	Feet, 0.5	Sept. 4, 5, 25	7.4	41.2
Edisto, River. Edisto, S. C.	5.9	Apr. 21, 22	1.0	July 28, 29	3.6	4.9
Pedee River. Cheraw, S. C.	35.5	Jan. 1	1.2	Sept. 25	6.6	34.3
Black River. Kingtree, S. C.	10.0	Mar. 5, 6	-0.4 (Aug. 4, 5) (Oct. 3-7)	July 28-30	3.6	10.4
Lynch Creek. Effingham, S. C.	15.0	Feb. 8	2.0	July 10, 11, 23-27	5.3	13.0
Santee River. St. Stephens, S. C.	15.2	Jan. 7	1.0	Sept. 6	6.5	14.2
Coosawee River. Columbia S. C.	22.0	Mar. 2	-0.2	Oct. 26	2.5	22.2
Wateree River. Camden, S. C.	30.5	Jan. 1	4.5	Sept. 25, 28	10.1	26.0
Waccamaw River. Conway, S. C.	7.2	Mar. 13	0.3	July 20-22	3.1	6.9
Savannah River. Calhoun Falls, S. C.	16.4	Feb. 28	1.4	June 11-14	3.3	15.0
Broad River. Carlton, Ga.	34.6	Mar. 1	6.7	Sept. 4	10.5	27.9
Flint River. Albany, Ga.	24.5	Feb. 28	2.1	Aug. 9-11 (Sept. 6-8) (Nov. 4)	3.4	22.4
Chattahoochee River. Westpoint, Ga.	22.2	Mar. 7	0.1	Nov. 21	4.9	22.1
Ocmulgee River. Macon, Ga.	20.0	Mar. 1	1.2	Aug. 26	4.1	18.8
			3.1	(7)	5.6	19.7

<sup>1</sup> Frozen for 3 months.<sup>2</sup> Frozen for 1 month.<sup>3</sup> Frozen for 2 months.<sup>4</sup> 10 months only.<sup>5</sup> 9 months only.<sup>6</sup> 11 months only.<sup>7</sup> On various dates.<sup>8</sup> On various dates in July and August.<sup>9</sup> Data incomplete.

TABLE VII.—Heights of rivers referred to zeros of gages, 1902—Continued.

Stations.	Highest water.		Lowest water.		Mean stage.	Annual stage.
	Stage.	Date.	Stage.	Date.		
Oconee River. Dublin, Ga.	Feet, 25.8	Mar. 5	Feet, -1.3	Sept. 11	4.3	27.1
Coosa River. Rome, Ga.	28.9	Mar. 30	0.2	Oct. 27, Nov. 1-5	3.7	28.6
Alabama River. Gadsden, Ala.	22.7	Mar. 6	-0.9	Nov. 13-17	4.0	23.6
Montgomery, Ala.	47.8	Mar. 31	-0.2	Sept. 24	8.4	48.0
Selma, Ala.	50.7	Apr. 2	-0.4	Aug. 25-27	10.4	51.1
Tombigbee River. Columbus, Miss.	30.6	Mar. 31	-3.6	Aug. 25-27	1.8	34.2
Demopolis, Ala.	64.5	Apr. 3	-3.1	Aug. 27	12.7	67.6
Black Warrior River. Tuscaloosa, Ala.	60.6	Mar. 29	0.0	(8)	10.7	60.6
Brazos River. Kopperl, Tex.	21.0	July 26, 28	-2.0	Aug. 20-Sept. 2	0.4	23.0
Waco, Tex.	33.3	July 27	0.2	Apr. 30	4.1	33.1
Booth, Tex.	38.0	Aug. 8	-0.7	Jan. 19-24	5.9	38.7
Red River of the North. Moorhead, Minn. (1)	10.5	May 23	6.7	Nov. 13, 14	7.5	3.8
Columbia River. Umatilla, Oreg.	21.7	May 31	-0.2	Feb. 10	6.9	21.9
The Dalles, Oreg.	36.8	June 1	-0.8	Feb. 4	10.7	37.6
Willamette River. Albany, Oreg.	24.5	Dec. 6	0.8	Sept. 1-20 (Oct. 4-12)	5.3	23.7
Portland, Oreg.	20.8	June 4	0.3	Feb. 2	8.1	20.5
Sacramento River. Red Bluff, Cal.	24.7	Feb. 10, 24	-0.1	Sept. 28-Oct. 11 (Oct. 15-20)	4.2	24.8
Sacramento, Cal.	28.2	Mar. 1	6.9	Oct. 6-8	14.8	21.3

<sup>1</sup> Frozen for 3 months.<sup>2</sup> Frozen for 1 month.<sup>3</sup> Frozen for 2 months.<sup>4</sup> 10 months only.<sup>5</sup> 9 months only.<sup>6</sup> 11 months only.<sup>7</sup> On various dates.<sup>8</sup> On various dates in July and August.<sup>9</sup> Data incomplete.

TABLE VIII.—Average monthly and annual departures of temperature from the normal, during 1902.

Districts.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
New England.	-1.0	0.0	+7.4	+2.4	-0.4	-2.3	-2.1	-1.6	+0.3	+1.1	+4.2	-3.5	+0.4
Middle Atlantic.	-2.0	-5.3	+5.3	+0.8	+0.4	-1.9	-0.2	-1.3	-0.5	+1.9	+6.3	-2.0	+0.2
South Atlantic.	-2.7	7.9	+0.9	-1.6	+2.6	0.4	1.6	-0.1	-0.8	-2.6	+5.8	+0.2	+0.1
Florida Peninsula.	-2.4	-5.8	+0.5	-0.6	+2.3	+1.0	+0.8	+0.6	+0.8	+2.6	+2.5	+1.3	+0.4
East Gulf.	-1.5	-8.5	+0.6	-1.2	+4.0	+2.5	+1.4	+3.2	-0.1	+0.4	+5.4	-1.7	+0.4
West Gulf.	-0.2	-4.9	+1.9	+0.6	+3.4	+2.1	-0.5	+2.9	-1.2	+1.3	+6.4	-1.8	+0.8
Ohio Valley and Tennessee.	-0.7	-9.8	+2.7	-1.7	+3.9	1.3	+0.9	0.0	-1.3	+2.5	+8.0	-2.5	+0.1
Lower Lakes.	-0.4	-4.7	+7.0	+1.6	-0.2	-4.1	+0.4	-2.2	-0.1	-0.9	+8.4	-3.0	+0.3
Upper Lakes.	+3.3	-0.9	+8.2	-1.7	+1.6	-4.0	+1.4	-1.7	-1.8	+1.6	+8.0	-1.1	+1.5
North Dakota.	+8.7	-4.4	+7.0	-1.4	+3.5	-5.4	-0.2	-1.1	-3.1	+0.2	+5.3	-5.4	+1.0
Upper Mississippi Valley.	+4.3	-5.5	-5.5	-1.1	+4.4	-3.3	+0.2	-1.8	-3.6	+3.3	+8.3	-3.4	+0.6
Missouri Valley.	+5.9	3.2	+5.1	0.8	+5.3	-3.6	-0.4	-0.8	-4.2	+3.2	+5.2	-6.5	+0.4
Northern Slope.	+5.8	-4.8	+1.8	-0.6	+3.1	-2.1	-2.4	+0.3	-1.4	+3.4	+0.9	-3.9	+0.8
Middle Slope.	+1.8	-0.2	+2.4	+0.5	+4.1	-0.4	-0.9	+3.0	-4.0	+2.9	+3.8	-4.0	+0.8
Southern Slope.	+1.2	+0.3	+1.5	+1.0	+1.7	+1.9	-1.0	+4.0	-3.2	+3.2	+3.6	-1.6	+1.0
Southern Plateau.	+2.2	+1.6	-4.0	+2.3	-1.5	+1.1	-3.3	-1.2	+0.5	+1.6	-0.4	-0.4	-0.1
Middle Plateau.	+1.6	+6.7	-2.5	0.1	0.8	+1.6	-3.7	-1.5	-0.6	+1.1	-0.9	+1.0	+0.2
Northern Plateau.	+1.8	+6.1	+0.9	1.3	-0.7	-0.3	-3.3	-1.7	+0.5	+3.4	0.0	-0.3	+0.4
North Pacific.	+0.6	-4.6	-1.3	-1.1	0.3	-0.1	0.7	+0.2	-0.1	+2.1	+0.2	-0.3	+0.3
Middle Pacific.	-1.2	-2.4	-1.9	-0.4	-1.5	+0.05	+0.1	+0.3	+1.4	+0.9	-1.0	+0.2	0.0
South Pacific.	+1.6	+0.6	-1.9	-1.0	-1.5	+0.8	-1.1	-2.0	+0.8	-0.5	-1.6	+0.1	-0.5

TABLE IX.—*Monthly and annual departures of precipitation from the normal, during 1902.*

Districts.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
New England.....	-1.8	+0.5	+2.3	-0.1	-1.7	+1.0	-1.1	-1.4	+0.3	-0.6	-2.9	+2.2	+2.1
Middle Atlantic.....	-1.0	+1.3	-0.4	-0.8	-1.6	-0.9	-1.1	-1.2	+1.0	-2.0	+0.5	+1.6	+0.2
South Atlantic.....	-2.7	+0.8	-0.8	-1.3	-1.6	-1.3	-1.6	-2.1	-0.8	+0.2	+1.3	+0.2	-10.2
Florida Peninsula.....	-1.3	+1.9	+0.7	-1.0	-0.9	+0.5	-0.3	-1.4	+0.7	+2.4	+1.0	+0.3	+1.6
East Gulf.....	-2.9	+1.5	+1.7	-1.7	-1.4	-4.2	-3.0	-2.6	+2.0	+0.9	-0.3	+0.7	-9.3
West Gulf.....	-1.1	-1.7	-0.2	-1.7	-1.4	-0.2	+1.7	-3.1	+1.0	-0.3	+1.9	-0.5	-5.6
Ohio Valley and Tennessee.....	-1.0	-2.6	-0.3	-1.8	-0.3	+1.0	-1.6	-1.4	-0.9	-0.5	-0.4	+1.5	-6.5
Lower Lakes.....	-0.9	-1.5	-0.3	0.6	0.2	+2.5	+2.3	-1.6	-1.4	-0.7	-1.6	+0.2	-1.0
Upper Lakes.....	-1.3	-0.8	-0.1	0.5	0.5	+0.3	+1.1	-1.1	-0.2	-0.7	0.0	-0.1	-2.9
North Dakota.....	0.4	+0.3	+1.5	-0.9	+1.4	-0.4	-0.4	+0.3	-0.6	-0.4	-0.4	-0.1	+0.7
Upper Mississippi Valley.....	-0.8	-1.0	+0.3	-0.7	+0.3	+1.2	+0.6	+2.0	-0.1	-0.3	+0.1	+0.7	+2.3
Missouri Valley.....	-0.2	-0.6	0.0	-1.4	-1.1	-1.0	-1.6	-1.1	-0.7	-0.2	+0.2	+1.1	+2.2
Northern Slope.....	-0.5	-0.2	+0.5	-0.6	-1.4	-0.4	-0.3	-0.4	+0.4	-0.3	-0.1	+0.2	+0.3
Middle Slope.....	-0.5	+0.5	-1.1	+2.8	-0.4	-0.2	+0.6	+0.6	+0.7	-0.2	+1.0	-0.2	+3.7
Southern Slope.....	-0.8	0.9	+1.2	-0.3	-4.8	-2.6	-0.6	-0.9	+2.1	-0.4	-2.2	-0.2	+4.8
Southern Plateau.....	0.5	-0.4	0.0	-0.3	0.1	-0.3	-0.4	+0.2	-0.2	-0.5	+1.1	-0.2	-1.0
Middle Plateau.....	-0.6	+0.2	+0.1	-0.2	-0.6	-0.4	-0.1	-0.4	-0.2	-0.6	+0.2	-0.3	-2.3
Northern Plateau.....	-1.2	+0.8	0.6	+0.2	+0.6	-0.8	-0.8	-0.1	-0.7	-0.7	+0.7	-0.2	-0.8
North Pacific.....	-2.7	+6.0	+1.0	-0.8	-0.2	-0.6	+0.7	-0.4	-1.0	-2.0	-3.5	+2.3	+5.8
Middle Pacific.....	-3.9	+6.4	-0.3	0.1	-0.2	-0.4	0.0	-0.1	-0.7	-0.8	+1.6	-1.5	+1.6
South Pacific.....	-1.4	+1.4	+0.4	-0.5	-0.4	-0.1	+0.2	0.0	0.1	+0.1	+0.5	-1.0	-0.9

TABLE X.—*Monthly and annual departures of relative humidity from the normal, during 1902.*

Districts.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
New England.....	-2	0	+5	+5	-6	-3	+1	-2	+2	-2	+3	+2	+0.2
Middle Atlantic.....	-2	0	+3	+1	-2	-3	+3	-0	-0	+4	0	+1	+1.0
South Atlantic.....	-5	-3	0	-12	-4	-12	-5	-5	-1	-2	-1	-1	-1.5
Florida Peninsula.....	0	-7	0	-12	0	-10	-7	-5	+2	-2	0	0	-2.5
East Gulf.....	-5	-7	0	-12	0	-10	-7	-5	+2	-2	0	0	-1.9
West Gulf.....	0	0	-2	+2	+4	-5	+3	-1	+3	+4	+9	+4	+1.8
Ohio Valley and Tennessee.....	-2	+3	+1	+2	0	-1	+1	+2	+3	+5	+1	+4	+1.8
Lower Lakes.....	-3	+2	0	0	0	-2	+8	+2	+3	+4	+1	+4	+2.1
Upper Lakes.....	-2	+1	-1	-3	+1	-1	+5	+1	+3	+1	-1	0	+0.5
North Dakota.....	-3	+2	+3	+4	+10	-1	0	+8	-12	-12	-12	0	+1.9
Upper Mississippi Valley.....	-2	+3	+3	-2	+5	+1	+5	+6	-4	+3	+6	+6	-3.2
Missouri Valley.....	-4	+3	-3	-4	+4	+3	+3	+8	-2	+3	+5	+7	+1.9
Northern Slope.....	+6	+9	+2	+7	+8	+7	-6	-7	+5	+7	+6	+13	+6.8
Middle Slope.....	+1	+4	0	+3	+8	+6	+2	0	+5	+7	+12	+10	+4.8
Southern Slope.....	-8	-14	-9	+3	+7	-12	+9	-9	0	0	+17	+5	-0.1
Southern Plateau.....	-8	-8	+2	-4	+1	-4	-5	-7	-5	-8	+4	+4	-3.2
Middle Plateau.....	0	0	+5	-4	-3	-5	+1	+5	-1	-2	+2	+1	+0.7
Northern Plateau.....	+1	+1	-4	-12	+3	0	+4	+1	-5	-2	+2	+1	0.0
North Pacific.....	-1	-2	-12	+1	-1	-6	-7	-1	-6	-3	+1	+1	-3.2
Middle Pacific.....	-6	+10	-4	+1	-1	-1	-7	-1	-3	+1	+6	-2	-1.0
South Pacific.....	-8	+8	-4	0	0	+1	+3	+6	-5	+5	+5	-2	+1.6

TABLE XI.—*Monthly and annual departures of average cloudiness from the normal, during 1902.*

Districts.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
New England.....	-0.2	+0.1	+0.7	+0.6	-0.1	+0.2	+0.9	-0.2	+0.8	+0.1	+0.9	-0.1	+0.3
Middle Atlantic.....	+0.5	+0.1	+0.1	+0.7	0.1	-0.8	+0.6	-0.4	+0.4	-0.2	+0.8	+0.8	+0.3
South Atlantic.....	-0.6	-0.1	+0.2	-0.3	-0.5	-0.8	-0.7	-0.5	+0.2	+0.2	+0.9	-0.1	-0.1
Florida Peninsula.....	-0.5	+0.3	+0.1	-0.4	-0.2	-0.1	-0.1	-0.5	-0.4	+0.7	+0.5	-0.9	-0.1
East Gulf.....	-0.1	+0.8	-0.9	0.0	+0.4	-1.6	+0.4	+0.1	-1.7	+0.8	+1.1	+0.6	+0.4
West Gulf.....	-0.1	0.0	-0.5	-0.3	-0.3	-1.4	-0.9	-1.9	0.0	-0.3	+1.7	-0.4	-0.1
Ohio Valley and Tennessee.....	-0.5	+0.1	-0.2	-0.1	-0.3	-0.2	-0.3	-0.2	+1.0	0.0	+0.8	+1.4	+0.2
Lower Lakes.....	-0.3	0.0	-0.1	-0.9	-0.3	-0.8	-0.7	-0.3	+0.6	-0.4	-0.5	+0.5	+0.1
Upper Lakes.....	-0.2	-0.4	0.0	-0.3	-0.4	-0.8	-0.9	-0.0	+1.2	-0.1	-0.6	+0.6	-0.3
North Dakota.....	-0.9	-0.7	-0.8	-0.7	-0.3	-0.2	-0.7	-0.5	-0.3	-0.4	-0.7	-0.4	-0.1
Upper Mississippi Valley.....	-0.8	-0.2	-0.9	-0.9	+0.3	+1.0	+0.5	-1.4	-1.1	0.0	-1.5	-1.1	+0.5
Missouri Valley.....	-0.9	+0.4	0.0	-0.7	-0.2	+0.7	-0.2	-1.3	+0.2	-0.2	+1.0	+1.3	+0.2
Northern Slope.....	-0.4	+1.2	+0.3	-0.3	-0.2	-0.3	-0.2	-0.1	+0.1	-0.3	+0.6	+1.0	+0.5
Middle Slope.....	-0.1	+0.9	-0.3	-0.3	+0.6	-1.2	-0.2	-0.2	+0.2	-0.6	+2.2	+1.0	+0.7
Southern Slope.....	-0.8	0.0	0.0	+0.4	+0.1	-0.8	-2.2	-2.0	-0.4	-0.2	+2.4	+0.2	+0.3
Southern Plateau.....	+0.6	+0.1	+0.3	-0.1	+0.4	-0.7	-0.7	-0.1	+0.2	0.0	+0.9	+0.5	+0.1
Middle Plateau.....	+0.2	+1.5	+0.5	+0.5	+0.1	-0.6	-0.9	+1.1	0.0	-0.2	+1.3	-0.3	+0.4
Northern Plateau.....	-0.7	+1.4	+0.3	+0.1	+0.7	-0.6	-0.2	-0.3	-0.5	-0.8	+0.6	+0.5	+0.1
North Pacific.....	-0.1	+1.3	+1.0	+0.9	+1.3	-0.5	-0.2	-0.3	-0.6	+0.2	+1.6	+1.1	+0.7
Middle Pacific.....	+0.3	+3.1	-0.7	+0.8	+0.1	-1.5	-0.4	+0.8	-0.4	+1.3	+1.5	+0.4	+0.5
South Pacific.....	+0.6	+1.3	-0.5	+0.1	-0.6	-0.8	+0.5	+0.6	+0.4	+0.6	0.0	0.0	+0.2